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Cooperation and Sustainable Future Markets

In the paper "Cooperation and Sustainable Future Markets: Stakeholder engagement and consumer integration for sustainable timber use in the construction sector" Justus von Geibler, Kora Kristof and Jan Walter highlight how sustainability demands can be integrated in early innovation phases and how new markets for sustainable products can be explored. The paper describes related experiences from a research project on future market development for timber in the building sector, conducted for the German Ministry for Research and Education (http://holzwende2020.de). The paper was presented at the Launch Conference of the Sustainable Consumption and Research Exchange (SCORE!) in Wuppertal, 23.-25.11.2006. Published online: http://www.score-network.org, Conference 1: SCORE! Launch conference, 23 November 2006, Proceedings Part I: Refereed Session I, p. 239-249.

In dem Paper „Kooperation und nachhaltige Zukunftsmärkte: Stakeholdereinbezug und Kundenintegration für nachhaltige Holznutzung im Bausektor" gehen Justus von Geibler, Kora Kristof und Jan Walter auf die Frage ein, wie der Nachhaltigkeitsfaktor in Innovationsprozesse und die Entstehung neuer Märkte eingebracht werden kann. Hierzu werden Ergebnisse eines BMBF-Forschungsprojektes zum Thema Zukunftsmärkte im Holzbau (http://holzwende2020.de) präsentiert. Das Paper wurde im Rahmen der Launch Conference of the Sustainable Consumption and Research Exchange (SCORE!), 23.-25.11.2006 in Wuppertal, vorgestellt.
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QSAM Cooperation and sustainable future markets

Stakeholder engagement and consumer integration for sustainable timber use in the building sector

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1 Introduction

In the debate on sustainable production and consumption renewable resources are promoted as a key for achieving global sustainability. The promotion of renewables is already taking place for a number of markets and policy fields such as energy, chemical and consumer products or building and construction. However, the major part of the market development debate takes place without consideration of sustainability criteria. For example, the emerging markets for biofuels will contribute to land degradation and loss of biodiversity if no sustainability criteria will be applied for their production. Beside environmental concerns, also key stakeholder demands and consumer aspects are rarely taken into account when new markets are developed. Therefore, new approaches and tools are needed to assess and to help govern the integrated consideration of life cycle implications for global sustainability. An important approach is the design of products and markets.

There is a substantial body of research regarding the sustainability effects of products and regarding the diffusion of ecological products. However, how sustainability demands can be integrated in early innovation phases and how new markets for sustainable products and services can be systematically explored are recent and challenging research questions. The paper highlights the related experiences from ongoing research projects on future markets of timber in the building sector, conducted for the German Ministry of Education and Research and the German Environmental Protection Agency.

First, this chapter presents innovative tools for sustainable future markets for "building and refurbishment with wood" at the company level. The tools focus on stakeholder engagement and customer integration. Then, the authors argue for an indicator set for the entire value chain as a crucial basis to realize, monitor and govern a change of markets towards sustainability. The methodological approach and steps towards this indicator set are outlined. Finally an indicator set will be presented, which enables the assessment of sustainability risks and opportunities in the entire value chain.

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Conclusions will be drawn on improved stakeholder engagement in life cycle management and consumer integration as conditions for the development of sustainable future markets for building with wood.

2 Exploring future markets: Innovative tools for stakeholder engagement and consumer integration

Within this paper we see markets as social arrangements that allow buyers and sellers to discover information and carry out a voluntary exchange of goods or services. Further actors and activities are linked to the market through the life cycle of the related product or service. New markets (or "future markets") are those that are in the process of emergence or those that will emerge in the future (see Fichter et al. 2006).

Research on how sustainability can be integrated in the development of future markets is limited; the topic has been addressed within the recent research project SUMMER (see www.summer-net.de). One key result of the project is that the identification and development of sustainable future markets depends mainly on the effective innovation alliances (actor cooperation) and the early interactive integration of users and customers in the process of innovation (consumer integration). Through those processes demand-side related requirements (such as specific preferences, real added-value for the user) as well as environmental and social aspects of product use can be considered timely and systematically (see Fichter et al. 2005).

Taking these results forward, the ongoing project "Holzwende2020plus: Sustainable future markets for building with wood", conducted for the German Federal Ministry of Education and Research (BMBF) addresses the value chain specific context and focuses on building and refurbishment with wood. Different tools have been chosen to support enterprises and networks to actively develop sustainable future markets in building and refurbishment with wood. Tools have been selected which

- support the creation of new or the development of young markets,
- enable productive interactions among market actors,
- secure the sustainability of planned, developing and applied techniques in the sector and
- are innovative because they are new or hardly applied in the building sector yet.

Table 1 presents these tools and their classification into four different functional classes (see Fichter et al. (2006) for a more detailed description). Tools for *user and customer integration* aim at the consideration of preferences of these groups into the product innovation process. Customers are not seen as buyers, they are the users of the future product. This means they can contribute to the understanding about specific problems and they can formulate needs and requests. The consumer can support the development of new ideas and help evaluate products and ideas. For the case of building and refurbishment the "users" could be planners, builders, constructors or house inhabitants. Tools for *interactive marketing* address the information of decision makers and customers about innovations and potentials for timber products in an interactive manner. For example, planners could be confronted with new product ideas in a decision-making workshop, they could use internet-based product catalogues or they could

communicate the strengths of their products directly in the realisation phase of the building at the construction site. Tools for *network management* are especially important for SMEs (small and medium enterprises), which often lack the capabilities for activities outside their normal business. However, through cooperation between SMEs synergies can be used for increased competitiveness and market creation. Neutral network coaches can be important for the development of efficient networks. The following subchapter will address the function of the fourth class of tools, the *sustainability assessment*, and will specifically focus on the development of a sustainability indicator set for the entire value chain.

Table 1: Overview of selected methods for the development of sustainable future markets for building and refurbishment with wood (adopted from Fichter et al. 2006)

		Market access strategy			
Tool	**Objective of tool**	User and customer integration	Interactive marketing	Network management	Sustainability assessment
Lead-user-method	Developing innovative ideas cooperatively with trend-setting users and customers	X			
Focus groups	Identifying demand of and acceptance for new products and services; examination of communication and marketing strategies	X			
Construction process research	Accompanying assessment of influencing factors, opinions and estimations of the constructors towards timber and towards co-operating firms	X			
Decision-maker workshops	Attacking prejudices and conveying knowledge to planners, investors, authorities and other key decision-makers		X		
Internet-based product catalogue	Enabling an easy and simple access to standardised and certified sustainable timber for architects		X		
Interactive construction site	Promoting publicity for pilot schemes through interactive media presentations and on-site events		X		
Innovation workshops	Creating ideas and innovative projects for sustainable new business fields, systems, products, services and processes			X	
Network coaching	Creating powerful networks through neutral network coaches which help to resolve conflicts and to establish goal-oriented, productive interactions			X	
Resource efficiency analysis	Assessing a product's life-cycle-wide use of natural resources as a solid, comparable ecologic basis for decision making				X
"Sustainability Check" for the entire value chain	Internet-based evaluation of strengths and shortcomings of firms in the value chain "building and refurbishment with wood" regarding the contribution to sustainable development				X
Ecological product design	Integrating ecological aspects (energy and resource efficiency, reduction of harmful substances and waste) in the product design process				X

3 Developing an integrated indicator set to assure the contribution of emerging markets to sustainability

This section will highlight the value of cross-sectoral sustainability indicator sets for exploring sustainable future markets for wood in the field of building and present a methodology to develop such an indicator set.

3.1 The challenge of value-chain-wide sustainability indicator sets

As the world is increasingly dominated by economic activities and faces at the same time severe problems in areas such as resources, pollution or

unfair allocation of benefits, it is apparent that future markets need to integrate sustainability aspects. However, the theoretical concept of sustainability has to be translated into concrete measurable and applicable targets and recommendations in order to be a guiding principle for planners, entrepreneurs and other relevant actors. Such information should enable the product designers integrate sustainability aspects in product and market development. Aspects to be considered could be for example

- advantages and disadvantages of substitution (e.g. services instead of new products),
- fault tolerance, flexibility, reversibility of applied technology, avoidance of lock-in effects (see e.g. Weizsäcker and Weizsäcker 1984 or Simonis, 1999),
- limitation of the intensity of negative effects, avoidance of hazardous technologies (see Gleich 1997) or
- accompanying measures to avoid psychological, technical or growth-related rebound effects (see Paech 2005).

The advantages of an integrated approach to social, environmental and economic effects of corporate action have been shown in the literature (e.g. Hroch and Schaltegger 2001 or Figge et al. 2001) and gradually companies do recognise the value of detailed sustainability performance information. It can support the management at the operational level to make their firm benefit from cost-saving potentials and to comply with existing and forthcoming regulatory frameworks. At the tactical level it improves products and services and at the strategic level it benchmarks the company against competitors and gives guidance on investment decisions. Here indicators are needed as communication tools.

Within this project's context, the sustainability assessment aims at the steering of future markets in the whole value chain of "building and refurbishment with wood" towards ecological, economical and social sustainability. The geographical focus should be Germany. The indicator set covers the entire value chain and should aid corporations ensuring a sustainable market success e.g. through securing natural resources, protecting the climate, evading harmful substances and improving quality of life.

3.2 Methodology for indicator set development

Sustainability as an overall concept is too abstract and broad for a direct and all-encompassing formulation of indicators. A methodological approach from the social sciences called conceptual specification or dimensional analysis (see figure 1) is used to break down the concept into dimensions, categories and aspects (see Kuhndt and Geibler 2002).

This approach was applied for the development of the indicator set (for further applications see Geibler et al. 2006, or Kuhndt et al. 2004). Four methodological steps were taken to obtain the indicator set. As the set should represent the whole value chain, first the value chain "building and refurbishment with wood" has to be specified. Then, based on a literature and stakeholder analysis, a preliminary indicator set is formulated. Ultimately through a process of stakeholder feedback the final indicator set is attained. These steps are described in more detail below.

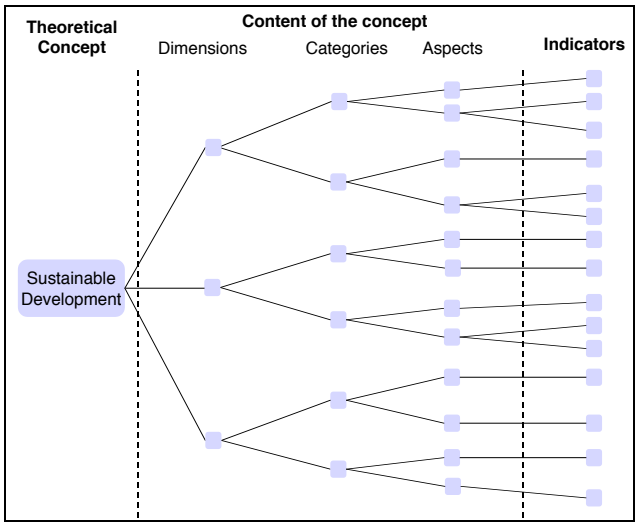

Figure 1: Concept specification for sustainable development
(Source: adopted from Köhler 1987: 85).

3.3 The process of indicator set development

The value chain "building and refurbishment with wood" consists of a highly complex network. Basically, it can be split into six stages: resource extraction (forestry), wood and timber processing industry, construction of buildings with timber, maintenance of buildings, refurbishment of old buildings and finally recycling and disposal. The chain is connected through the activities of trade and logistics (see figure 2).

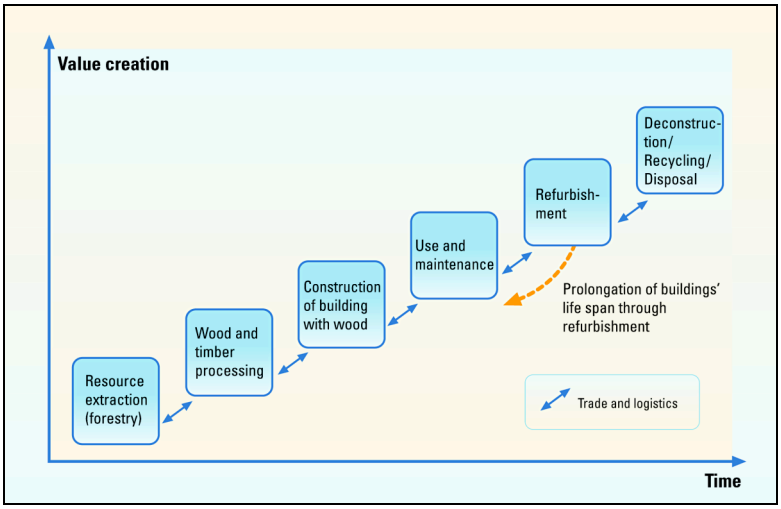

Figure 2: The value chain "building and refurbishment with wood"
(Source: own compilation)

The next step is the literature and stakeholder analysis for drafting an indicator set. The different chain-relevant actors (persons and institutions

from science, the economy, networks, etc.) are identified. Positions and knowledge of these actors and a wide rage of initiatives are assessed regarding their objectives and indicators for (parts of) the value chain. Furthermore relevant scientific literature has been reviewed (see e.g. Wallbaum 2002). Some national and international initiatives are listed in table 2 (see also Kristof et al. 2006).

Table 2: Initiatives along the value chain "building and refurbishment with wood" analysed for indicator set development (examples)

Value chain phase	Sustainability initiatives (examples)
Resource extraction (forestry)	**UN Agenda 21, Chapter 11** provides guidance on how and why to combat deforestation. **Ministerial Conference on the Protection of Forests in Europe (MCPFE)** addresses issues on forests and forestry and declares recommendations for the protection and sustainable management on forests in Europe. **German National Forest Programme (NWP)** analyses environmental, social and economic benefits of forests in line with national priorities. Strategies and measures for sustainable forest management are published. **Forest Stewardship Council (FSC)** sets international standards for responsible forest management and accredits independent third party organizations. **Programme for Endorsement of Forest Certification Schemes (PEFC)** promotes sustainably managed forests through independent third party certification and provides an assurance mechanism to purchasers. **World Business Council for Sustainable Development (WBCSD)** aims at providing business leadership for change toward sustainable development and promotes a sustainable forest products industry as responsible managers of carbon.
Wood and timber processing	**Chain of custody certification** certifies wholesalers, manufacturers, distributors, and retailers, who handle wood coming from forests certified according to standards such as FSC or PEFC.
Construction of building with timber	**German Federal Ministry of Transport, Building and Urban Affairs** aim with the guidelines for sustainable construction to support planers with an instrument to systemically implement sustainability in the construction. **natureplus label** European seal of quality for building products, construction materials and home furnishings that are environmentally friendly, do not have negative health effects and properly perform their function.
Use and maintenance	**Holzabsatzfonds (German Timber Promotion Fund),** central marketing institution of the German forestry and wood processing industries, supports the sector with cross-regional and regional marketing measures.
Refurbishment	**Action Program Environment and Health North Rhine Westphalia (APUG NRW)** aims to strengthen the links between environmental and health protection; promotes to take health-related aspects in refurbishments (incl. pollutant-free indoor air) into account.
Deconstruction/ Recycling/ Disposal	**Waste Wood Ordinance (AltholzV)** lays down requirements for the recycling and energy recovery as well as for the disposal of waste wood on the basis of the Closed Substance Cycle and Waste Management Act.
Value-chain-wide aspects	**Federal Ministry of Food, Agriculture and Consumer Protection** promote in the "Charter for Wood" measures for an increase in the use of wood. **Global Reporting Initiative (GRI)** creates guidelines and standards in corporate sustainability reporting. **Integrated Product Policy (IPP) of the European Commission** seeks to minimise environmental impacts by looking at all phases of a products' life-cycle and taking action where it is most effective.

A review of the chain highlights that the entire chain is linked to significant sustainability impacts, which can be illustrated by taking the import of illegal timber and the building sector's resource intensiveness as examples.

The import of tropical wood from illegal sources has been analysed in a study by the Federal Research Centre for Forestry and Forest Products (see Dieter und Küpker 2006). In 2005 an estimated amount of between 0,7 and

1,3 million m³ wood has been imported into Germany originated from these sources. These figures respectively represent 34 to 65 percent of the overall German import of tropical wood. For Russia, a country which is covered by the third biggest area of old forests worldwide, the WWF expects that between 25 and 50 percent of the lumber derives from illegal sources (WWF 2004). On a global scale, about 350 million people who live within or adjacent to dense forests depend on them to a high degree for subsistence and income (World bank 2004).

"Construction and habitation" is the field with the biggest material input in Germany; it comprises of one third of the nations total material use. This corresponds to 76 tons of biotic and abiotic material per year and citizen (Wallbaum, Müller, Kaiser 2005). Hence this field is an important starting-point on the way to a more sustainable resource use (German Federal Environment Agency, 2005). Of all renewable commodities in the construction sector wood is used the most (Deimling and Vetter 2000: 1). Furthermore its processing is comparatively low in energy intensity and environmentally sound (German Council for Sustainable Development 2004). Consequently, wood and timber should play an important role in the substitution for non-renewable materials in the building sector.

Within the chain, a number of initiatives have emerged to promote sustainable development. Criteria and standards have been set up. However the full coverage of the entire chain has rarely been achieved. Two far reaching approaches are the chain of custody approach for forest certification and the natureplus label which reach the chain up to the point of sale. However, consumption issues or end of life aspects have not yet been integrated into indicator sets.

Through an intensive process of discussions about and balancing of the material, the first draft of indicator sets covering the entire chain (incl. the use and end-of-life phases) has been established. However, the process of identifying key aspects and indicators is a matter of subjective choice and there is a risk that relevant issues are not considered or irrelevant issues are included (see Rennings 1994: 144; Fürtjes 1982: 38). Thus, the results have been reviewed based on a triangulation approach, i.e. the findings have been double-checked through another empirical method. Accordingly the draft has been put through a process of interview-based stakeholder feedback for modifications. Interview partners representing different links in the chain, from a broad societal spectrum and having knowledge about the German as well as international situation have been selected. Guided interviews of 45 minutes up to two hours were held with 16 persons and transcriptions were checked with them. The results of the interviews have been analysed qualitatively and quantitatively to reassess and adjust the draft indicator set.

4 The indicator set

On the basis of the results of the stakeholder feedback, an indicator set for the value chain "building and refurbishment with wood" was developed for direct application for corporations and key actors in the chain. This indicator set is presented in Table 3. Additionally, a second indicator set has been developed which addresses policy making (see Kristof et al. 2006).

Table 3: Indicator set for the value-chain "construction and refurbishment with wood" for companies (adopted from Kristof et al. 2006).

Targets and indicators for the distinct tiers of the value chain	
1. Forestry	
Sustainable forestry	Forest management according to sustainability certification scheme, externally verified
Efficient market exploitation	Development of synergetic effects through clustering
	Tailor-made supply of high-quality timber products for the building sector
	Activities for the development of new market segments (e.g. tourism)
2. Industrial and handcraft timber and wood processing	
Processing of regional/ certified wood	Ratio of used regionally produced wood and timber
	Ratio of used certified wood and timber
Benchmarking / product labelling	Ratio of used certified wood products according sustainability labelling scheme
Use cascades	Ration of recyclable wood products
3. Sustainable construction and refurbishment with wood	
Sustainability in the phase of planning	Planning construction and refurbishment for increased wood utilisation
	Supply of flexible design solutions/ modular systems
	Integration of consumer, builder and constructors in the planning process
	Integration of the use phase aspects in the evaluation of planning alternatives
	Planning of regular survey of refurbishment requirements
Utilisation of sustainable wood products	Ratio of regional wood-based construction material
	Ratio of certified wood-based construction material
	Environmental and healthy surface treatment
	Utilisation of recyclable and reusable wood construction material
Sustainability during the construction phase	Effective management of construction and interface management between different actors involved
	Use of rationalisation potentials, e.g. by pre-fabricated solutions
	Documentation of material use in construction and refurbishment
4. Use and maintenance of buildings	
Improvement of living quality and safety	Living quality (indoor air quality, noise emissions)
	Safety (toxicity in case of fire, long-term static stability)
Cost efficiency in the operating stage	Expenses for operation and maintenance
	Expected life time and intervals for refurbishment
	Opportunities for maintenance and repair incl. own contribution by inhabitant
5. Sustainable disposal of used building material	
Sustainable disposal	Controlled energetic use of non-recyclable wood
	Environmentally sound disposal of wood, which cannot be reused
Value-chain-wide targets and indicators	
Sustainable business management	Sustainability business mission and monitoring of goal achievement
	Use of environmental an or sustainability management systems
	Reduction of material, energy and water consumption
	Ratio of the utilisation of renewable energy and resources
	Reduction of emission and pollution
Sustainability management in the value-chain (incl. commerce and logistics)	Sustainability requirements for suppliers
	Reduction and optimisation of transport requirements
	Market analysis and consumer integration in sustainable product development
	Target-group specific information on the construction material wood
	Orientation of marketing on sustainability targets
Empowerment, cooperation and networking	Regular staff training on construction and refurbishment with wood
	Cooperation through (regional) cluster management or networks
	Cooperation with R&D institutions (knowledge and technology transfer)
Competitiveness and innovation ability	Process and product innovations (incl. product-service system solutions)
	Creating and securing regional employment
	Quality assurance
	Utilisation of subsidy opportunities

In order to turn this indicator set into an operational tool, a tailor-made internet-based "Sustainability Check" is currently developed. The "Sustainability Check" should support entrepreneurs to evaluate the sustainability performance of their existing or future products without the necessity for direct and time-consuming contact with relevant stakeholders or consumers.

It became apparent that most of the organizations in the value chain are small and medium-sized enterprises. Furthermore, most of the practitioners in the chain and potential users could be described as novices in the field of the sustainability future markets. This can be explained by the lack of resources to employ a specialist and the relative novelty of the topic in the sector. Consequently, the Internet tool has to provide explanatory content and fulfil an educational purpose for the target audience. Questions are posed for each indicator and an immediate aggregation of the results will allow a timely assessment even for product development phases with limited data availability.

5 Conclusions and next steps

The paper highlighted that effective innovation alliances (actor cooperation) and the early integration of users and customers in the process of innovation (consumer integration) are conditions for the development of sustainable future markets. A number of tools at company level have been presented to develop sustainable future markets for building with wood. The paper specifically addressed the development of an sustainability indicator set for the entire value chain of "building and refurbishment with wood". This is a novelty since other related indicator sets have only covered some part of the value chain. Especially the consumer and end-of-life phase has been rarely considered. It turns out that stakeholder involvement and the consideration of consumer needs can help to identify key issues in the chain and facilitates the consideration of sustainability in emerging markets.

The developed indicator set as well as other presented tools for sustainable future markets will be presented as Internet-based instruments at an Internet learning platform on the project's homepage (www.holzwende2020.de). All tools will be described regarding their specific approaches, conditions for successful use and benefits for the user and sustainable market development.

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Further links

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